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NEW AND NOTEWORTHY RECORDS  
OF  
HYMENOMYCETES IN INDIA

BY

B. K. BAKSHI AND BALWANT SINGH

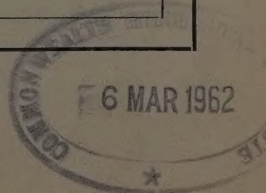
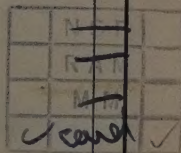
*Forest Pathology Branch,  
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# NEW AND NOTEWORTHY RECORDS OF HYMENOMYCETES IN INDIA

BY

B. K. BAKSHI AND BALWANT SINGH

(Forest Pathology Branch, Forest Research Institute, Dehra Dun, India)

In listing new records of 37 species of Hymenomycetes in India, one of us (Bakshi, 1958) remarked that the Hymenomycetous flora in India resembles largely that of Europe and America. In this paper, nine species of *Polyporus* (including one of *Polystictus*), as they occur in India, are studied from sporophore, seven of which are also studied in culture. As these fungi have not been described from India, their detailed account is given, which will also enable comparison with these fungi as they occur elsewhere.

The cultures of the fungi have been studied on 2.5 per cent malt agar at 25°C in the dark. The growth rate refers to growth in radius. The standard tests of distinguishing white rot and brown rot in culture have been followed. The colours within commas are from Ridgway (1912).

## 1. *Polyporus amorphus* Fries

Sporophore annual, sessile, broadly effused with reflexed margins (Pl. I, fig. 1) or reflexed, imbricate, leathery when fresh, rigid when dry, usually  $2-8 \times 1-4 \times 0.1-0.3$  cm., larger in effused forms; surface white to grey, matted tomentose, grooved, zonate, margin incurved when dry; context white, drying to a thin, brown waxy resinous layer, which becomes prominent in old specimens, about 1 mm. broad, flanked above by the matted tomentose surface; hymenial surface pink, pinkish-red, orange-red, pores waxy, regular to irregular, angular or oblique, 2-5 per mm., edges thin margin white or pale to light yellow at places, sterile, pore tubes concolorous with hymenium or pink below, light yellow towards context, upto 1.5 mm. long; basidia clavate (Text-fig. 1a),  $3-4\mu$  broad; basidiospores hyaline, thin-walled, allantoid, guttulate (Text-fig. 1b),  $3-4 \times 0.8-1.3\mu$ ; hyphae hyaline, thick-walled with lumen narrow or obliterated, rarely branched (Text-fig. 1c),  $3-5\mu$  broad, and hyaline, thin-walled or partially thick-walled, branched, with clamp connections common, (Text-fig. 1d),  $2-3.5\mu$  broad. Produces white rhizomorphic strands in the bark.

**Occurrence:** A common fungus on bark of stumps and logs of conifers like fir (*Abies pindrow*), deodar (*Cedrus deodara*), spruce (*Picea smithiana*), blue pine (*Pinus wallichiana*) and chir (*Pinus roxburghii*), Western Himalayas, Chakrata, (Uttar Pradesh); Kulu (Punjab); Simla (Himachal Pradesh); altitude 5,000-8,000 ft.

**Distribution:** World-wide: Europe, North America, New Zealand, India.

**Rot:** White stringy rot in which the decayed wood becomes light brown.

**Cultural characters:** *Growth characters.* Growth slow, 1.0-1.3 cm. in 7 days. Advancing zone hyaline, even appressed. Mat white, appressed and farinaceous when young (Pl. I, fig. 2), becoming subfelty later. Reverse unchanged. Odour none. On gallic and tannic acid agars,

diffusion zones very strong, radial growth nil on the former and trace to 0.5 cm. on latter. On gentian violet agar, growth very slow and medium not discoloured.

*Hyphal characters:* Advancing zone: hyphae hyaline, thin-walled, branched, septate with clamp connections (Text-fig. 1e),  $1.5-3.0\mu$  in diameter. Aerial mycelium: (a) hyphae as in advancing zone (b) fibre hyphae hyaline, with lumen narrow or lacking (Text-fig. 1f),  $2.5-4.0\mu$  in diameter. Submerged mycelium: hyphae as in advancing zone, sometimes swollen. Fruitbody: forms readily in culture, irregular spatula-like, basidia and basidiospores as in natural fruitbody.

The fungus is distinguished by its white matted tomentose surface, bright pink to orange red, waxy hymenium, thin, waxy, brown resinous context.

In culture, the fungus is distinguished by the white mat in which the fruitbody develops readily, the presence of diffusion zones on gallic or tannic acid agars and the presence of thin-walled, nodose-septate and also fibre hyphae.

*P. amorphus* is close to *Polyporus dichrous*, under which the similarities of the two fungi are discussed.

## 2. *Polyporus biformis* Fries

Sporophore sessile, broadly resupinate, effuso-reflexed or reflexed, imbricate or laterally confluent (Pl. I, fig. 3), soft, coriaceous when fresh, corky to somewhat rigid when dry, usually  $1.5-7 \times 1.4 \times 0.2-0.8$  cm; surface white to light yellow ('pale ochraceous buff'), margin dark brown ('hazel' to 'chestnut brown') when dry, tomentose when fresh (Pl. I, fig. 5), on drying with appressed radiating fibrils of darker colour, nearly glabrous, azonate to subzonate, margin somewhat thin; context fibrous, white to pale yellow, upto 0.5 cm. thick; hymenial surface white, drying light brown, dark brown or reddish brown, pores irregular, angular or daedaloid (Pl. I, fig. 4), 1-2 per mm., edges thin, soon breaking up into teeth beyond margin, basidia clavate (Text-fig. 2a),  $3.6-5.0\mu$  broad; basidiospores hyaline, smooth, cylindrical to slightly curved, sometimes with small apiculus (Text-fig. 2b),  $5.5-7.8 \times 2.0-2.5\mu$ ; hyphae thick-walled with lumen narrow or obliterated, rarely branched (Text-fig. 2c), hyaline, with occasional clamp connections, often breaking at the nodes (Text-fig. 2d);  $3-6\mu$  broad, abundant, sometimes nearly hyaline, oil globules present on the outer walls of hyphae (Text-fig. 2e), which become yellowish to dark brown in older fructifications; thin-walled, branched, septate with clamp connections (Text-fig. 2f)  $3.0-4.0\mu$  in diameter, few.

*Occurrence:* Very common on logs or commonly on dead standing trees of *Quercus dilatata* and *Q. incana* and rarely on spruce logs in Western Himalayas, altitude 5,000-8,000 ft. Also on dying branches of *Vitex negundo* and *Castanea sativa*, Dehra Dun, altitude 2,000 ft.

*Distribution:* U.S.A., Canada, India (New record).

*Rot:* Straw coloured stringy decay of sap and heartwood.

**Cultural characters:** *Growth characters.* Growth rapid, radius 4.0–6.0 cm. in 7 days. Advancing zone: hyaline, even, raised aerial mycelium upto limit of growth. Mat hyaline to white, cottony, becoming appressed later (Pl. I, fig. 6). Reverse bleaching. Odour faint. On gallic acid the diffusion zones weak, the radial growth 0.7–1.3 cm. On tannic acid agar, no diffusion zone and growth. On gentian violet agar, growth moderate and medium partially bleaching. Fruitbody: Regular pored fruitbody develops in old cultures.

*Hyphal characters:* Advancing zone: hyphae hyaline, thin-walled, branched, septate with clamp connections, sometimes broken at clamps (Text-fig. 2g),  $2.0\text{--}4.5\mu$  in diameter. Aerial mycelium: hyphae as in advancing zone, sometimes showing small projections (Text-fig. 2h). Submerged mycelium: same as aerial mycelium, much branched, sometimes flexuous.

The identity of *P. biformis* from sporophores was confirmed by Dr. Ruth Macrae.

*P. biformis* is distinguished by its radiating fibrillose surface, and large irregular pores which soon become dentate. It is close to *Polyporus pargamenus*, which species was mistakenly referred to under *P. biformis* by Klotzsch (Lloyd, 1909-1912). The fibrillose pileus and absence of cystidia (capitate), comparatively thicker context in *P. biformis* distinguish the fungus from *P. pargamenus*. *P. biformis* is also close to *P. consors* which however possesses globose to subglobose spores. Oxidase reactions in culture are strong for *P. pargamenus* and *P. consors* but nil to weak for *P. biformis*. Sporophores of *P. biformis* are easily liable to be destroyed by insects in the herbarium.

### 3. *Polyporus conchoides* (Mont.) Lloyd

Sporophore sessile, effused or effuso-reflexed, imbricate (Pl. I, fig. 7), flexible when fresh, drying hard, usually  $3\text{--}5 \times 2\text{--}4 \times 0.1$  cm.; surface soaking water readily, white when fresh, drying nearly white, light brown to light pinkish brown, sometimes very finely tomentose, fibrillose and rugulose due to small raised areas, azonate, margin thin, incurved; context white, 0.5–1.5 mm. thick; hymenial surface with a tint of flesh colour, separable from context as a thin parchment-like layer, waxy (Pl. II, fig. 8), not wettable, occasionally rugulose, pores minute indistinguishable to naked eye, round 6–8 per mm. edges thick, pore tubes shallow upto 0.3 mm. long; spores not observed, hyaline, smooth, allantoid,  $4\text{--}5.5 \times 1.25\mu$  (Cunningham, 1948), allantoid,  $4\text{--}5 \times 1\text{--}1.5\mu$  (Lloyd, 1913-1916); hyphae hyaline, thick-walled with narrow lumen becoming less thick-walled towards hymenium, branched, septa simple (Text-fig. 3a),  $3\text{--}5\mu$  broad.

**Occurrence:** On hardwood, *Premna bengalensis* Jalpaiguri, West Bengal; *Gmelina arborea* and *Buchanania lancifolia*, Chittagong hills, Pakistan.

**Distribution:** Mainly tropical. Madagascar, Ceylon, Brazil, Cuba, South Africa, New Zealand and India.

**Rot:** White sap rot.

**Cultural characters:** *Growth characters.* Growth rapid, radius 4 cm. in 7 days. Advancing zone appressed, indistinct. Mat hyaline to subhyaline almost submerged and appressed, mycelium radiating from the inoculum and branching when young (Pl. II, fig. 9). Reverse unchanged. Odour none. On gallic and tannic acid agars, reaction nil, growth trace to 0.7 cm. on former and nil on latter.

**Hyphal characters:** Advancing zone: hyphae hyaline, thin-walled, branched, simple septate (Text-fig. 3b), 2.0–4 $\mu$  broad. Aerial or submerged mycelium: same as in advancing zone, hyphae profusely branched (Text-fig. 3c), some hyphae (in old culture) unstained with slightly thick walls, with irregular swellings and short protuberances (Text-fig. 3d).

The fungus is close to *P. dichrous* in the presence of thin waxy hymenium which can be stripped off from context when fresh. They are distinguished from the colour of the hymenial surface which, when dry, is light flesh pink in *P. conchoides* and reddish purple to blackish in *P. dichrous*. They are also distinguished by the absence of clamp connections in the former and their presence in the latter.

Clamp connections said to be present in *P. conchoides* (Cunningham, 1948) do not occur in specimens studied by us, as also observed by Overholts (1953).

The fungus is distinguished by its thin form, pale flesh coloured, waxy, non-wettable hymenial surface which is easily separable from context when fresh, fibrillose and rugulose upper surface which readily soaks water.

#### 4. *Polystictus cotoneus* (Pat & Har.) Sacc.

Sporophore annual, sessile, effuso-reflexed (Pl. II, fig. 11) often laterally connate, flexible; pileus soft to touch, 1–4 cm. long, 0.3–2.2 cm. wide and 0.1–0.3 cm. thick, larger when effused; surface white when fresh, pale ochraceous buff when dry, minutely pubescent to glabrous, soft, margin thin, context white to 'pale ochraceous salmon', upto 0.3 cm. thick; hymenial surface (Pl. II, fig. 10) white, becoming 'tilleul buff', 'vinaceous buff' to 'avellaneous', pores regular, usually circular to sub-circular, rarely slightly oblique, 2–3 (–4) per mm. edges thick, tubes upto 0.2 cm. long, margin sterile upto 2.0 mm. colour lighter than hymenium; basidia clavate (Text-fig. 4a), 5.0–6.5 $\mu$  in diameter; basidiospores hyaline, thin-walled, cylindrical to elliptical, sometimes shortly curved (Text-fig. 4b), 6.6–12.0  $\times$  2.5–3.5 $\mu$ ; hyphal pegs in hymenium and crystals in section present; hyphae hyaline, (a) thick-walled, flexuous, rarely branched (Text-fig. 4c), 2.0–4.4 $\mu$  in diameter, common, (b) slightly thick to thick-walled, profusely branched hyphae (Text-fig. 4d), 2.0–3.0 $\mu$  in diameter and (c) thin to slightly thick-walled, rarely septate with clamp connections, less common, sometimes broken at nodes (Text-fig. 4e).

**Occurrence:** On dying branches of *Castanea sativa*, *Duranta plumieri* and *Shorea robusta*, Dehra Dun (Uttar Pradesh) (New Record).

**Rot:** White spongy sap rot.

**Cultural characters:** *Growth characters.* Growth rapid, 4.0–6.0 cm. Mat white cottony-woolly towards margin (Pl. II, fig. 12) becoming felty in older region, advancing zone even, raised aerial mycelium up to the limit of growth. Reverse bleached. Odour faint. On gallic and tannic acid agars, diffusion zones very strong, the radial growth 0.5–1.0 cm. on former and 2.0–3 cm. on latter. On gentian violet agar, growth vigorous and medium discoloured.

*Hyphal characters*: Advancing zone: hyphae hyaline, thin-walled, branched, septate with clamp connections (Text-fig. 4f),  $1.5-4.5\mu$  in diameter. Aerial mycelium: (a) hyphae as in advancing zone; (b) fibre hyphae aseptate, branched (Text-fig. 4g),  $1.0-2.5\mu$  in diameter. Submerged mycelium: hyphae as in advancing zone but with much short branches and irregular protuberances, sometimes flexuous (Text-fig. 4h).

The fungus was sent to Kew as *Polystictus venulosus* Jungh. Dr. Reid identified it as *Polystictus cotoneus* (Pat. & Har.) Sacc. and remarked further:

"There is no material of *P. venulosus* Jungh. at Kew for comparison, but I agree that the description could apply to your plant. I should be interested to hear if you consider *P. cotoneus* and *P. venulosus* to be synonyms."

The sporophore is distinguished by its thin, soft to touch, almost glabrous short pileus, white to vinaceous hymenial surface with sterile margin and long cylindrical ellipsoid basidiospores. *P. cotoneus* is close to *P. hirsutus* but differs in lacking velvety pubescent and thick pileus.

### 5. *Polyporus dichrous* Fries

Sporophore sessile, effuso-reflexed or reflexed, imbricate, coriaceous when fresh, rigid when dry, sometimes with inturned margin,  $2-3 \times 1-2 \times 0.3$  cm. or larger in effused forms; surface white, compactly tomentose, soft, azonate (Pl. III, fig. 21), context white, corky, separated from the hymenium by narrow dark line upto 2 mm. thick; hymenial surface (Pl. III fig. 20) flesh colour when young turning flesh pink ('tawny', 'russet') when mature, peeling off when fresh or wet, pores waxy, regular, round, 5-8 per mm., edges slightly thick, margin sterile, white to pale coloured, pore tubes concolorous less than one mm. long; basidia clavate (Text-fig. 5a),  $2.5-3.0\mu$  broad; basidiospores hyaline, allantoid (Text-fig. 5b),  $2.6-3.7 \times 0.5-0.7\mu$ ; hyphae hyaline, partially thick-walled, branched with clamp connections (Text-fig. 5c),  $2.0-4.5\mu$  broad, often broken at clamps (Text-fig. 5d).

*Occurrence*: On dead hardwoods of sal (*Shorea robusta*) and an unknown wood in plains of India, not common.

*Distribution*: U.S.A., Canada, India.

*Rot*: Probably brown rot.

*Cultural characters*: *Growth characters*. Growth rapid, 4.0 cm. in one week. Advancing zone even or somewhat uneven later on, appressed, hyaline. Mat hyaline, appressed, farinaceous in older region, floccose, becoming white to pale, finally developing regular pored surface in two to three weeks (Pl. III, fig. 22). Reverse becoming yellowish. Odour none. On gallic and tannic acid agars no diffusion zones, growth trace and nil respectively. On gentian violet growth slow, media not bleaching.

*Hyphal characters*: Advancing zone: hyphae hyaline, thin-walled, branched, septate with clamp connections,  $2.0-4.5\mu$  broad. Aerial mycelium: same as in advancing zone, thin to slightly thick-walled, sometimes broken at clamps,  $1.5-3.0\mu$  broad; Submerged mycelium: same as in advancing zone upto  $6\mu$  broad. Basidia and basidiospores, same as in natural fruitbody.

*P. dichrous* is easily recognised by its white compactly tomentose, azonate surface, hymenium gelatinous, flesh to reddish coloured, minute pores and context separating from hymenium by a narrow dark zone, in having minute allantoid spores and monomitic system of clamped hyphae in fruitbody.

The fungus is close to *P. amorphus* in the white matted tomentose surface, waxy and coloured hymenium. The absence of zonations on upper surface and thick-walled hyphae without clamps in *P. dichrous* distinguish it from *P. amorphus*. Further the hymenium is much darker, 'russet' in *P. dichrous*, while *P. amorphus* is orange-red.

The only description of *P. dichrous* from India is by Bose (1934). The upper surface is described as zonate, which is not so in *P. dichrous*. Further the characters of basidiospores are unlike those of *P. dichrous*.

*P. amorphus*, *P. dichrous* and *P. conchoides* are close. *P. amorphus* is distinguished in having slow growth, strong reaction on gallic and tannic acid media, dimitic system of (clamped and fibre) hyphae in culture; while *P. dichrous* shows rapid growth, nil reaction on gallic and tannic acid media and lacks fibre hyphae in culture. *P. dichrous* differs from *P. conchoides* in having clamped hyphae which are absent in sporophore of *P. conchoides*.

## 6. *Polyporus dryadeus* Pers. ex Fries

Sporophore sessile, spongy when fresh, woody when dry,  $12-15 \times 10-12 \times 2-3$  cm., distilling drops of water when young (Overholts, 1953); surface with shades of gray and reddish brown to black, glabrous, uneven, with a thin crust cracking, margin thin; context dark brown to rusty brown, soft with a silky sheen, faintly zonate, 1 cm. thick; hymenial surface dark brown, prominently cracking (Pl. III, fig. 15), pores round or slightly angular, thin-walled, 3-5 per mm., edges slightly thick, pore tubes brown, cavities whitish,  $0.4-1.2$  cm. long; basidia clavate (Text-fig. 6a),  $5-7\mu$  broad; spores nearly hyaline, subglobose or ovoid, apiculate (Text-fig. 6b),  $4.4-7 \times 3.7-7\mu$ ; setae dark brown, ventricose, tip straight or curved (Text-fig. 6c), hymenial,  $16-25 \times 5-10\mu$ , not abundant; hyphae pale brown, thin or somewhat thick-walled, rarely branched, with simple septa (Text-fig. 6d),  $4-9\mu$  broad, hyaline and narrower towards hymenium,  $2.0-5.0\mu$  broad.

*Occurrence*: On stumps of oaks, Western Himalayas (Chakrata).

*Distribution*: Europe, North America, Japan, India (New record).

*Rot*: White rot.

The large fruitbody which is woody when dry, the crust on the surface, cracking hymenium and ventricose setae with straight or curved tips distinguish *P. dryadeus*. Thind and Chatrath (1960) have described a new variety, *brevisporus* of this species based on smaller size of spores which measure  $4.4-5.6 \times 3.6-5.2\mu$ .

### 7. *Polyporus fragilis* Fries

Sporophore sessile attached by broad or narrow base, sometimes pendant (Pl. III, fig. 18), light in weight, soft when fresh, becoming hard, coriaceous and brittle when dry, pileus  $3.4 \times 1.5$ - $2.0 \times 0.6$ - $1.3$  cm.; surface white becoming pinkish brown with reddish tinge, minutely tomentose matted, soft, azonate or lightly zonate towards edge; context white to light brown, fibrous, upto 3 mm. thick; hymenial surface white when fresh, turning brown, pinkish brown to rusty brown on drying, pores irregular, angular, adjacent pore mouths join to become sinuous (Pl. III, fig. 17), 3-5 per mm., margin thick or thin, fertile, pore tubes white soon becoming rusty brown, upto 7 mm. long; basidia clavate (Text-fig. 7a),  $4-5\mu$  broad, basidiospores hyaline, smooth, cylindric to slightly allantoid, 1-2 guttulate (Text-fig. 7b),  $3.0-4.3 \times 1.0-1.6$ -( $1.8\mu$ ); hyphal pegs (Text-fig. 7c) almost gelatinised, present in the hymenium and project upto  $40\mu$  beyond it; hyphae hyaline to brown, flexuous, thick-walled, with broad or narrow irregular lumen, branched, with clamp connections (Text-fig. 7d), with walls sometimes incrustated,  $3-6$ -( $12\mu$ ) broad.

**Occurrence:** On logs of spruce and deodar, W. Himalayas, Chakrata, Simla, altitude 6,000-8,000 ft.

**Distribution:** U.S.A., Canada, India, (New record).

**Rot:** Brown rot.

**Cultural characters:** *Growth characters.* Growth very slow, 0.4-0.6 cm. Mat white, appressed, farinaceous to short woolly (Pl. III, fig. 19), thin towards margin, advancing zone hyaline, even to bayed, appressed. Reverse unchanged. Odour strong and bitter in old cultures. On gallic and tannic acid agars no diffusion zones, radial growth 0.5-0.6 cm. on former and nil on latter. On gentian violet agar, growth very slow and medium not discoloured. Fruitbody: pore surface develops in old cultures.

**Hyphal characters:** Advancing zone: hyphae thin-walled, branched, septate with clamp connection (Text-fig. 7e), broken into segments (Text-fig. 7f),  $1.5-5.5\mu$  in diameter. Aerial mycelium: hyphae as in advancing zone but frequently broken into segments sometimes swollen. Submerged hyphae as in aerial mycelium.

*P. fragilis* is close to *P. leucospongia* in appearance. However, the usually reflexed, pendant sporophores, rusty brown hymenial surface when dry and absence of lines in the context in *P. fragilis* distinguish it from *P. leucospongia* which has normally effuso-reflexed sporophores, white to light biscuit coloured hymenial surface when dry, and lines in the context. In culture, *P. leucospongia* has dark brown to nearly black oil globules on the outer walls of the hyphae.

*P. palustris* is also close to *P. fragilis* but the former has white to light coloured hymenium with regular pores. In culture, the presence of chlamydospores and fibre hyphae in the fast growing *P. palustris* distinguish this from the slow growing *P. fragilis* where they are lacking.

The sporophore and culture of *P. fragilis* were confirmed by Dr. Ruth Macrae and Dr. Mildred Nobles. *P. fragilis* is recognised by its usually reflexed, pendant, light sporophores, which become discoloured (white to rusty brown) when handled, irregular pores, small allantoid spores, hyphal pegs and clamped hyphae.

### 8. *Polyporus fumosus* (Pers.) Fr.

Sporophore sessile, effused with reflexed margins (Pl. III, fig. 16), imbricate, leathery when fresh, rigid when dry, usually  $5-9 \times 3-12 \times 0.5-1.5$  cm.; surface white to ochraceous, blackish gray towards base, finely tomentose to glabrous, azonate, margin thick, not curved; context white or pale yellow, separated from the tube layer by a narrow dark brown line, zonate with a few indistinct blackish zones running across, corky,  $0.5-1.2$  cm. thick; hymenial surface white when fresh blackish gray when dry, pores regular or irregular, round or slightly angular, becoming irpiciform at places (Pl. III, fig. 16),  $3-5$  per mm. edges thin, pore tubes concolorous, usually  $1$  mm. long; basidia persistent, clavate (Text-fig. 8a),  $5.5-6.5\mu$  in diameter; basidiospores hyaline, ellipsoid (Text fig. 8b),  $3.5-6 \times 2-3.3\mu$ ; hyphae hyaline, thin-walled or slightly thick-walled, sparsely branched, septate with clamp connections (Text-fig. 8c),  $3-5.5\mu$  broad.

*Occurrence*: On dead standing deodar (*Cedrus deodara*), W. Himalayas (Chakrata), altitude 6,000 ft. Usually collected on hardwoods in America.

*Distribution*: America, Europe, India (New record).

*Rot*: White fibrous rot.

*P. fumosus* is distinguished by its finely tomentose, azonate surface, hymenial surface pure white becoming blackish gray, thick context which shows distinctly narrow dark line separating the layer of tubes, ellipsoid spores and monomitie hyphal system.

*P. fumosus* differs from *P. adustus* in its much thicker fruitbody, thick margin and broader context in which faint blackish zones occur. The pore surface is white when fresh turning blackish gray on drying, which in *P. adustus* is always blackish gray. The pores in *P. fumosus* are larger and tend to be irregular.

### 9. *Polyporus semipileatus* Peck

Sporophore usually effuso-reflexed with short free margins, often resupinate, flexible when fresh, rigid when dry, usually  $0.5-5.5 \times 0.5-3 \times 0.1-0.5$  cm.; surface white or nearly so, finely matted tomentose, azonate, margin sometimes inflexed; context white, upto  $3$  mm. thick; hymenial surface white, drying 'pale ochraceous buff' and woody brown sometimes 'olive gray' or greenish (alga colour), pores angular to oblique (Pl. III, fig. 13), entire,  $4-6$  per mm., edges thin, tubes white to pale, upto  $2$  mm. long; basidia clavate (Text-fig. 9a),  $3\mu$  broad; basidiospores hyaline, thin-walled, smooth, cylindric, allantoid (Text-fig. 9b),  $2-3 \times 0.5\mu$ ; hyphae hyaline (a) thick-walled, flexuous, rarely branched with narrow or obliterated lumen (Text-fig. 9c),  $2.0-5.0\mu$  broad, common, (b) slightly thick or partially thick-walled, branched, septate with clamp connections (Text-fig. 9d),  $1.5-3\mu$  broad, less common. Contorted incrustated hyphal tips (Text-fig. 9e) present.

*Occurrence*: On *Quercus dilatata*, dead branches, in the Western Himalayas (Chakrata), altitude 6,000-8,000 ft.

*Distribution*: U.S.A., Canada, Europe, India (New record).

*Rot*: White stringy rot.

*Cultural characters: Growth characters.* Growth slow, 1.2-1.5 cm. Mat white, appressed, farinaceous (Pl. II, fig. 14) later becoming felty, not easily separable. Advancing zone hyaline, appressed, almost invisible, even. Reverse unchanged or 'ochraceous tawny' to 'cinnamon brown.' No odour. On gallic and tannic acid agars, diffusion zones strong, the radial growth nil on former, trace to 0.5 cm. on latter. On gentian violet agar, growth slow and medium partially bleaching. Fruit body: regular pored surface develops in old culture.

*Hyphal characters:* Advancing zone: hyphae hyaline, branched, septate with clamp connections (Text-fig. 9f), 2.0-3.5 $\mu$  in diameter. Aerial mycelium: (i) hyphae as in advancing zone: (ii) contorted incrusting hyphal tips abundant (Text-fig. 9g), 4.0-6.0 $\mu$  in diameter. Submerged mycelium: same as advancing mycelium.

The sporophore and culture of the fungus were confirmed by Dr. Ruth Macrae and Dr. Mildred Nobles.

*P. semipileatus* is distinguished by the white tomentose surface and white hymenial surface which sometimes becomes greenish and the unusually minute spores. In culture it is distinguished by having white mat, very slow growth, strong reaction on gallic and tannic acid media and abundant contorted incrusting hyphal tips.

Our sincere thanks are due to Drs. Mildred Nobles, Ruth Macrae and David Reid for their opinion.

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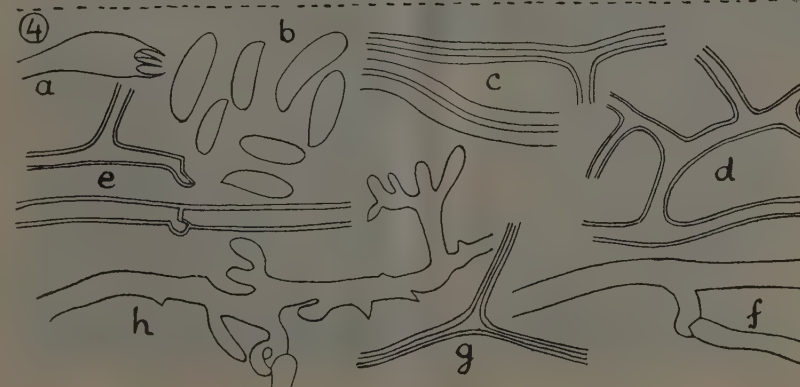
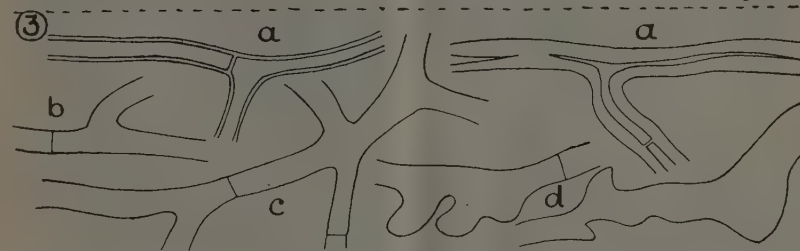
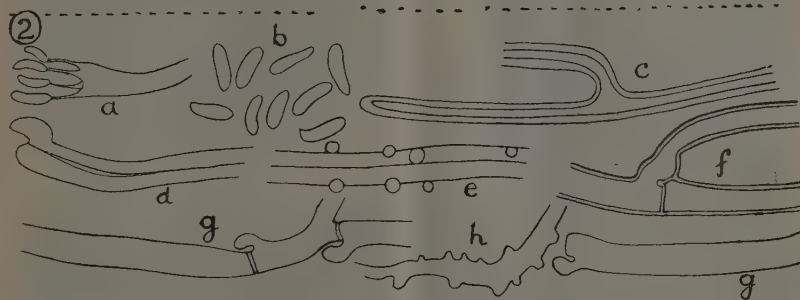
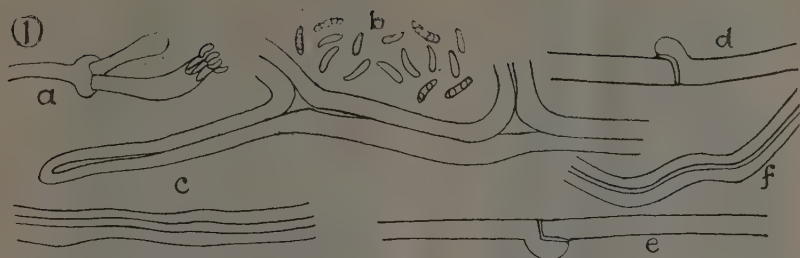
## REFERENCES

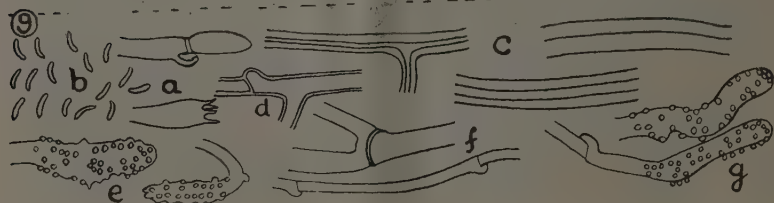
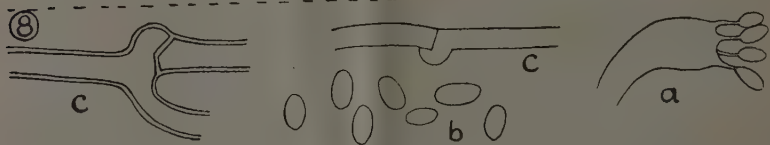
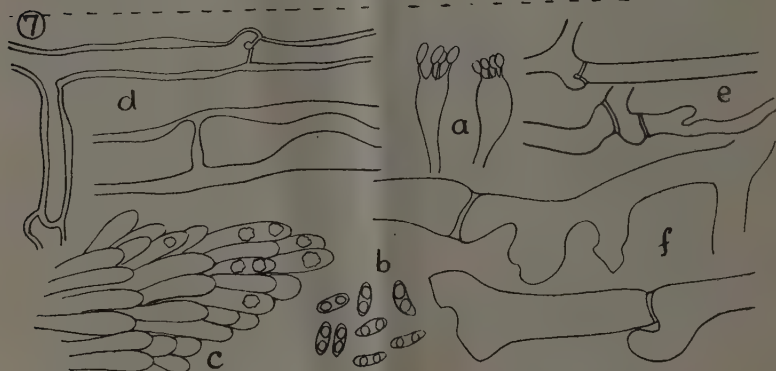
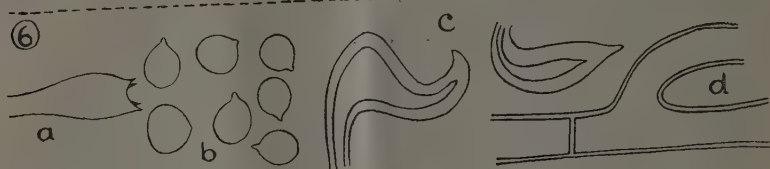
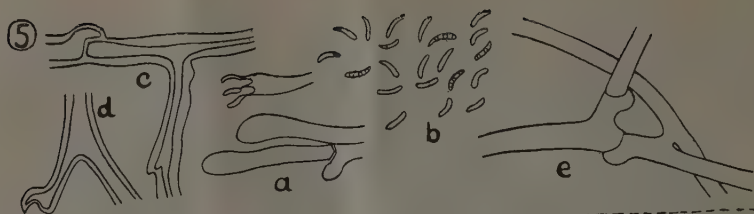
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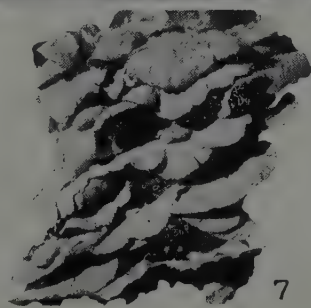
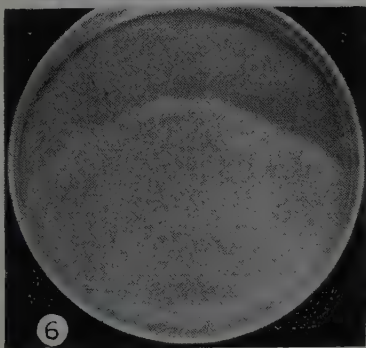
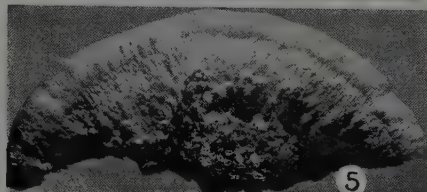
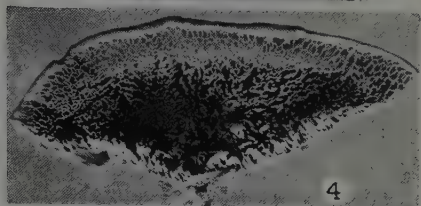
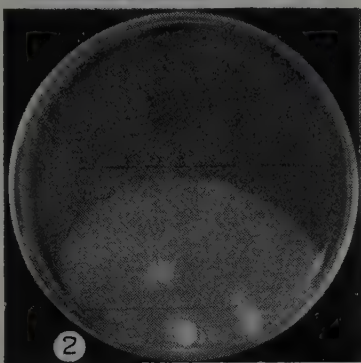
## EXPLANATION OF TEXT FIGURES

(ALL FIGS. x 1250)

- Fig. 1. *Polyporus amorphus*: a-d, from sporophore; e-f, from culture: a, basidium, b, basidiospores; c, thick-walled hypha; d, thin-walled hypha with clamp; e, thin-walled hypha with clamp; f, fibre hypha.
- Fig. 2. *Polyporus biformis*: a-f, from sporophore; g-h, from culture: a, basidium; b, basidiospores; c, thick-walled hypha, breaking at node in d; e, hypha showing oil globules; f, hypha showing clamp; g, thin-walled hyphae with clamps, breaking at node; h, hypha showing projections on wall.
- Fig. 3. *Polyporus conchoides*: a, from sporophore; b-d, from culture: a, thick-walled hyphae, b-d, thin-walled hyphae, profusely branched in c, irregular protuberances in d.
- Fig. 4. *Polystictus cotoneus*: a-e, from sporophore; f-h, from culture: a, basidium; b, basidiospores; c, thick-walled hyphae; d, slightly thick-walled much branched hypha; e, hyphae with clamps, breaking at node; f, thin-walled hypha with clamp; g, thick-walled hypha; h, hypha with short branches.
- Fig. 5. *Polyporus dichrous*: a-d, from sporophore; e, from culture: a, basidia; b, basidiospores; c-d, thick-walled hyphae with clamps, broken at node in d; e, thin-walled hypha with clamps.
- Fig. 6. *Polyporus dryadeus*: a-d, from sporophore: a, basidium; b, basidiospore; c, setae; d, slightly thick-walled hypha.
- Fig. 7. *Polyporus fragilis*: a-d, from sporophore; e-f, from culture: a, basidia; b, basidiospores; c, hyphal peg; d, thick-walled hyphae with clamps; e-f, thin-walled hyphae with clamp, broken at node in f.
- Fig. 8. *Polyporus fumosus*: a-c, from sporophore: a, basidium; b, basidiospores; c, thin or slightly thick-walled hyphae with clamps.
- Fig. 9. *Polyporus semipileatus*: a-d, from sporophore; e-g, from culture: a, basidia; b, basidiospores; c, thick-walled hyphae; d, slightly thick-walled hypha with clamp; e, incrustated hypha tips; f, thin-walled hyphae with clamps; g, incrustated hyphal tips.
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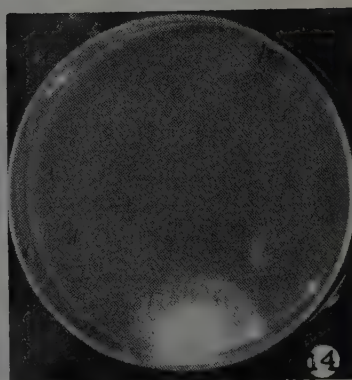
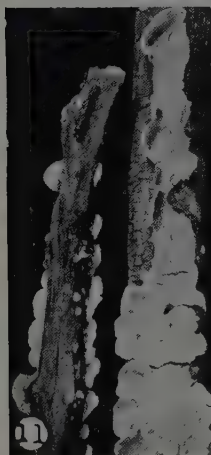
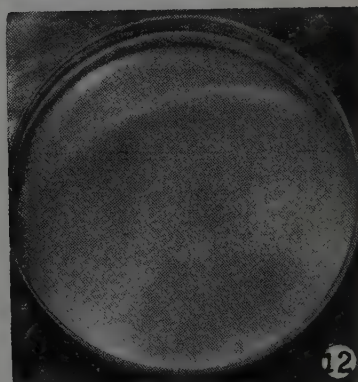
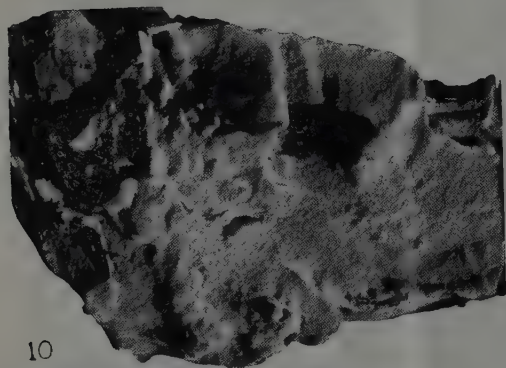
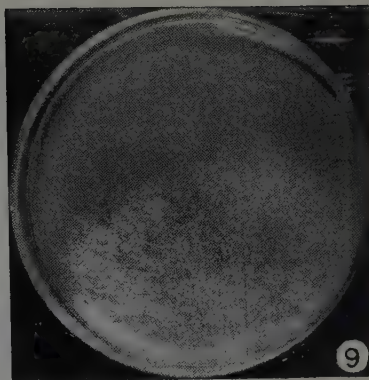
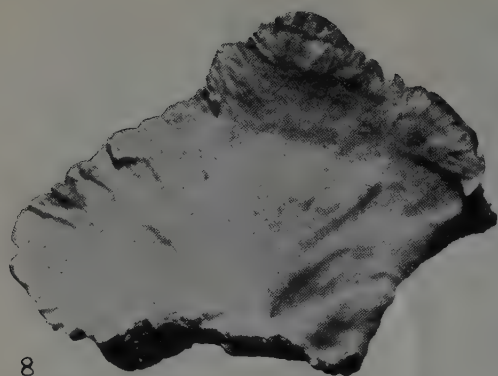






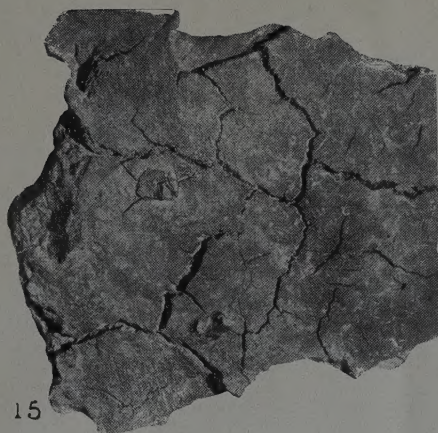
# PLATE I

- Fig. 1. *Polyporus amorphus*, sporophore (x 1.0).  
 Fig. 2. *Polyporus amorphus*, culture, 20 days old (x 0.6).  
 Fig. 3. *Polyporus biformis*, imbricate sporophores (x 0.3).  
 Fig. 4. *Polyporus biformis*, hymenial surface (x 1.0).  
 Fig. 5. *Polyporus biformis*, upper surface (x 1.0).  
 Fig. 6. *Polyporus biformis*, culture, 14 days old (x 0.6).  
 Fig. 7. *Polyporus conchooides*, imbricate sporophores (x 0.3).



# PLATE II

- Fig. 8. *Polyporus conchoides*, hymenial surface (x 1.3).
- Fig. 9. *Polyporus conchoides*, culture, 14 days old (x 0.6).
- Fig. 10. *Polyporus cotoneus*, hymenial surface (x 0.8).
- Fig. 11. *Polyporus cotoneus*, general habit (x 0.3).
- Fig. 12. *Polyporus cotoneus*, culture, 14 days old (x 0.6).
- Fig. 13. *Polyporus semipileatus*, hymenial surface (x 1.5).
- Fig. 14. *Polyporus semipileatus*, culture, 23 days old (x 0.6).



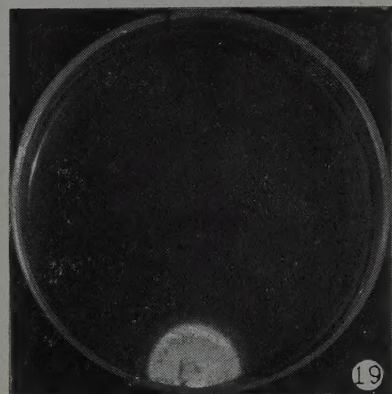
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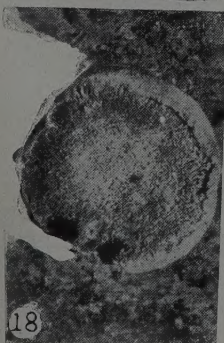
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### PLATE III

- Fig. 15. *Polyporus dryadeus*, hymenial surface (x 0.5)  
 Fig. 16. *Polyporus fumosus*, sporophores (x 0.5).  
 Fig. 17. *Polyporus fragilis*, sporophore (x 2.0).  
 Fig. 18. *Polyporus fragilis*, sporophore, pendant form (x 1.3).  
 Fig. 19. *Polyporus fragilis*, culture, 25 days old (x 0.6).  
 Fig. 20. *Polyporus dichrous*, hymenial surface (x 1.8).  
 Fig. 21. *Polyporus dichrous*, upper surface (x 1.8).  
 Fig. 22. *Polyporus dichrous*, culture, 14 days old (x 0.6).





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